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Metrik Medan Gravitasi Maxwell–Einstein Benda Bermuatan Simetri Aksial Statik

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Abstrak

Telah diperoleh solusi persamaan medan gravitasi Maxwell–Einstein untuk benda bermuatan listrik simetri aksial statik. Tensor Ricci simetri aksial statik disederhanakan dengan pemilihan koordinat silinder kanonis Weyl. Tensor energi–momentum diperoleh melalui formalisme aksi Hilbert–Einstein dengan rapat Lagrangian medan elektromagnet tanpa rapat arus ($J_\mu = 0$) sehingga merupakan solusi elektrovakum. Selanjutnya, persamaan medan diselesaikan dengan pengambilan asumsi berdasar realita fisis bahwa ruang–waktu dipengaruhi oleh distribusi materi–energi sehingga medan ψ (geometri) adalah fungsi dari potensial ϕ yang diinterpretasikan sebagai potensial elektrostatik.

Kata Kunci: Maxwell–Einstein, Medan Gravitasi, Simetri Aksial Statik

Abstract

The solution of Einstein–Maxwell gravitational field for a static axially symmetric electric charged body was presented. The Ricci tensor of static axially symmetric was simplified using Weyl canonical cylindrical coordinates. Energy–momentum tensor formulated from Einstein–Hilbert action formalism with Lagrangian of electromagnetic field without current density ($J_\mu = 0$) making the electrovacuum solution. Then, the field equations were solved with the assumption based on physical reality that the spacetime was affected by energy and mass distribution created the geometry – field ψ was a function of potential ϕ interpreted as an electrostatic potential.

Keywords: Einstein–Maxwell, Gravitational Field, Static Axial Symmetry